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ELECTRICAL DEVICE

Prior Art

The invention relates to an electrical device as generically defined by the preamble to the main claim.

From Published, Non-Examined German Patent Application DE-OS 42 22 838, an electrical device is already known in which power components for the control unit electronics of an engine control system, which create heat loss, are disposed on a printed circuit board in a housing.

In order to dissipate the lost heat from power components, in electronic control units with a printed circuit board, the power components are mounted on a cooling surface. The number of power components is therefore limited by the available space on the cooling surface and by the maximum dissipatable power loss. The layout surface area available for the other circuit elements on a printed circuit board is thus reduced by the fastening points of the power components to the cooling surfaces acting as a heat sink.

Since in electronic circuit designs, semiconductor-based power components are increasingly taking the place of electromechanical components such as relays, the number of such power components to be used becomes greater, as does the size of the circuitry and other components, because of sophisticated electronics. Yet increasing the volume of the electrical devices is not desirable.

Advantages of the Invention

The electrical device according to the invention as defined by the characteristics of the body of claim 1 is

advantageous particularly in that because of the complex accommodation of power components on particular ribs on the housing frame, additional space is obtained for a number of power components, with optimal utilization of the layout surface area on the printed circuit board. Because of the thermal contact of the ribs with the housing frame, good dissipation of the power loss to further heat sinks is assured.

Because the ribs are offset from the respective housing frame wall, an electrically appropriate distribution of circuitry over the printed circuit board, with only a small number of connecting lines, is possible. The requisite layout surface area can thus be kept slight, so that in many cases an additional printed circuit board with additional cooling bodies, which is otherwise necessary, can be omitted. Because of the compact design thus made possible, excellent shielding of the circuit and thus good electromagnetic compatibility of the electrical device is attainable. The power loss of the power components in the form of heat can be dissipated by means of the ribs directly from the housing frame to the environment, via the housing bottom.

It is especially advantageous if the printed circuit board with the relatively vulnerable electronic circuit is located on the side of the housing frame opposite the housing bottom. As a result, a considerably greater power loss can be dissipated, since the connection between the housing frame and the housing bottom can be designed over a large surface area, and a high number of connecting points (screw connections) can also be provided. The available surface area for the printed circuit board layout is relatively large, since the printed circuit board is not interrupted by recesses that are otherwise needed for purposes of heat dissipation.

Advantageous features of the electrical device according to the invention are recited in the dependent claims, and in particular the disposition of crosswise and/or lengthwise ribs may be provided as a function of the particular application.

Drawing

One exemplary embodiment of the electrical device according to the invention will be explained in conjunction with the sole drawing figure, which shows a section through an electrical device with power components on a printed circuit board.

Description of the Exemplary Embodiment

In the sectional view through an electrical device seen in the drawing, a housing frame 1 is firmly retained on a metal housing bottom 2 via screw connections, not shown here, thus making a thermal contact. A number of power components 4 are soldered by their electrical terminals 5 to a printed circuit board 3 that is also secured to the housing frame 1. The power components 4 are retained, by their heat-carrying housing parts for dissipating the power loss, on crosswise ribs 6 and lengthwise ribs 7. For better retention and to assure good thermal contact with the housing frame 1, they are pressed against the ribs 6 and 7 by means of metal clamps 8.

The housing bottom 2 provided with fins 9 for increasing the surface area is mounted in this exemplary embodiment on the side of the housing frame 1 opposite the printed circuit board 3, and as a result the heat dissipation is effected to the environment without impairing the printed

circuit board 3. The plug parts necessary for the external terminals can be mounted in the usual way on the printed circuit board 3. Additional housing parts may also be joined on, or may also be formed by the units onto which the electrical device is mounted.